trained as engineers and have a fairly generous knowledge of physics, with only a smattering of chemistry, mineralogy and geology; yet following the example of the French engineers, which I have elsewhere mentioned, they seem to have a propensity for the discussion of the origin and properties of bitumens, a discussion which involves some of the most intricate problems in the sciences above mentioned now engaging the attention of scientific men. Hence, it is not strange, that outside the engineering problems which it treats intelligently, this book should be a chaotic jumble, brought together without chronological arrangement, without order as to the natural divisions of subjects, and discussed without discrimination and without satisfactory result. These defects of judgment and purpose would have been greatly mitigated if Mr. Tillson had not committed two unpardonable offences as an author. First, he cites from authors all over the world without giving in a single instance reference to the original memoirs, by which a reader can verify or extend the passage cited. Second, he has attributed to authors cited, language that they have never used, by substituting for the author's language his own abstract or paraphrase. In illustration, see page 43, where he patches up a definition of 'bitumen' by 'transposing Professor Sadtler's words and adding some of Mr. Richardson's.' He puts this patchwork that neither Sadtler nor Richardson would recognize, in quotation marks. From whom is it quoted? Again, on page 53, he quotes from my 'Tenth Census Report.' I read the passage with amazement. I knew I had never used such language. When I turned to the report I found that Mr. Tillson had substituted his own paraphrase for the language used by myself and had enclosed it in quotation marks. Comment on such atrocious work is unnecessary.

It would require too much time and space to show in detail all the blunders that are found in the nearly 40 pages devoted to 'Asphalt.' One other must suffice. This book is infested with the ill-disguised fallacy that material from the Trinidad Pitch Lake is superior to all other for street pavements. The old threadbare story of Eighth Avenue is rehearsed, etc.

I regret the necessity of such unqualified condemnation of much of this book; but the character of the criticism results from the nature of the case. I think I am safe in assuming that no railroad corporation would employ a chemist to construct a skew-arched bridge.

S. F. Peckham.

American Education and What Shall It Be? Preliminary Report of the Committee of the Society for the Promotion of Engineering Education; made at the New York Meeting, July 2, 3, 1900. Reprinted, with discussion, from the Annual Volume of Proceedings; H. S. Jacoby, Secretary, Ithaca, N. Y. 8vo. Pp. 74. Price, 25 cents.

One of the speakers in the discussion began with the remark that this report marks an era in its department, that it was the first document of the sort which, so far as he had observed, recognized the fact that there may be 'many educations.' While it may not be the fact that the publication of this report was the first recognition of the necessity of various educations for various sorts and conditions of men,* it is probably the first in which the fact of a variety of educations as a need of the time being recognized by authority is itself noted. The document is a reprint, from the transactions of the Society, of the report of a committee consisting of six representative educators in applied science and technical subjects, selected from representative institutions at Madison, St. Louis, Ithaca, Minneapolis, Boston and Philadelphia, who were requested to endeavor to give formal expression to the views held by them collectively on the question above quoted in the title of the paper thus prepared.

Space does not here permit of the presentation of any full abstract of the report, which is one which should be carefully read by every educator—and by our legislators even more carefully, if possible. The discussion is no less suggestive and invaluable than the report; a considerable number of well-known teachers and engineers taking part.

* 'The Mechanic Arts and Modern Educations,' an address delivered at Richmond, Va., before the Mechanics' Institute of Virginia, by R. H. Thurston, May 18, 1894, Richmond, Va. William Ellis Jones. 1894. 12mo. Pp. 23.

The committee agrees that there is a place for many kinds of school, and that they, as a rule, have their separate purposes and are, in fact, not competitors either among themselves or with the common school system of the country. Manual training schools, in which, as Dr. Woodward has said, 'the whole boy is sent to school,' are commended as adjuncts to the existing system, and, as a matter of fact, such schools are rapidly becoming incorporated into the common school systems of our larger cities and industrial towns. Manual training and art education are considered desirable as a part of all public school education, and provision should be made in them for both boys and girls, each in a suitable manner. The committee considers such a combination to be 'the ideal public school' for our country. The State agricultural and mechanical colleges constitute, in many of our States, another and important class, and are doing work which is adjudged to be far more than a compensation for their cost to the people. They are usually true secondary industrial schools, but they apparently divert many young men from agriculture into mechanical vocations. Minnesota, however, for example, and some other States, have very successful schools of agriculture.*

The higher engineering schools are considered to be strictly professional schools of a high grade, which 'rank with the best' in any country. Our monotechnic or trade schools are still to be founded. They are considered to constitute the greatest need of the educational system. While the committee asserts that 'all schooling should lead primarily to the elevation and development of the individual, and only secondarily to a greater material prosperity,' and italicizes the statement, it is considered, nevertheless, imperative that such institutions be established, if we are to hold our own, in the future, in the great competition among the nations. It is asserted that such schools need not be so conducted as to abrogate the principle just stated. The State of Massachusetts is already systematically encouraging the organization of textile schools, for example. It is such schools as these that have made Germany what she is, industrially.

Supplementary schools for workers are commended, such as evening schools, correspondence schools, etc. Proprietary and public and Y. M. C. A. evening schools, for example, are doing an immensely valuable work, and these schools cannot be too generally encouraged and sustained. Professor Higgins proposed 'half-time' school is thought well worthy of trial and is considered to have great promise. The higher schools of commerce and of business, which have been organized in some of our colleges already, are thought to be a step in the right direction.

The report is assumed to be preliminary and is to be later supplemented by special discussions of details and of special forms of industrial education. On the whole it would appear that the committee feel as did one of the gentlemen taking part in the discussion, Mr. Rothwell, said: "greater results can certainly be secured by educating the masses than in educating the small number in the higher departments of engineering"; although, as the same speaker remarked: "Nothing can be said against that." As Mr. Fay, of Rhode Island, put it, in his report to the State Legislature, 1877, the great problem is 'that of the adaptation of industrial education to our existing systems of mental training in the public schools,' and in this the committee is also agreed. The committee and the disputants seem to have substantially agreed with Col. E. D. Meier, who asserted that 'the point that the better part of the man should be educated is met by an education based upon the natural sciences'—after the manner advised by Huxley, we may presume.

R. H. THURSTON.

* In the State of New York, it may be observed, while the State college, Cornell University, has a proportionally large body of mechanical engineering students and a relatively small body of agriculturalists, the latter, through its 'university extension work,' is performing an enormous task. It sent out in the year 1899–1900, over 7,000,000 pages of bulletins to farmers, embodying results of research in agricultural science and arts; it taught classes of 20,000 in 'Farmers' classes,' 25,000 in its 'Teachers' courses,' 35,000 in its 'Junior Naturalists' Clubs' and 2,500 in 'Home Nature Study,' a total of 83,000 students outside of the university.—President Schurman's Report, 1899–1900.